

CLAIMS

What is claimed is:

1. A method for detecting ringback in a received signal, said method comprising:
 - a. calculating the energy of said received signal;
 - b. calculating a threshold based on said energy in said received signal;
 - c. determining whether ringback is present in said received signal by comparing said energy in said received signal to said threshold; and
 - d. outputting a control signal indicating whether ringback is present in said received signal.
2. The method of claim 1 further comprising setting said threshold to an initial value at the start of a call and adjusting said threshold upwardly based on said energy of said received signal.
3. The method of claim 1 wherein outputting a control signal comprises changing said control signal to a first state indicative of no ringback to a second state indicative of ringback when ringback is detected.
4. The method of claim 3 wherein changing said control signal further comprises changing said control signal from said second state indicative of ringback to said first state indicative of no ringback when ringback is no longer detected.

5. The method of claim 4 further including maintaining said control signal in said second state for a predetermined period of time after ringback is no longer detected before changing to said first state.

5 6. The method of claim 1 further comprising using said control signal to control an audio processing circuit.

10 7. The method of claim 6 wherein using said control signal to control an audio processing circuit comprises freezing an adaptive algorithm within said audio processing circuit when ringback is detected.

8. The method of claim 7 wherein said adaptive algorithm is a voice activity detector.

15 9. The method of claim 7 wherein said adaptive algorithm is an acoustic echo canceller.

20 10. The method of claim 7 wherein said adaptive algorithm is a network echo canceller.

11. The method of claim 7 wherein said adaptive algorithm is a noise estimator.

12. The method of claim 7 wherein said adaptive algorithm is a channel gain estimator.

13. The method of claim 7 wherein said adaptive algorithm is a noise suppressor.

14. The method of claim 5 wherein using said control signal to control an audio processing circuit comprises changing the operating mode of said audio processing circuit.

15. The method of claim 14 wherein said audio processing circuit is a residual echo suppressor and wherein said control signal is used to place said residual echo suppressor in a bypass mode.

16. A ringback detector comprising:

- a. an energy calculator to calculate the energy of a received signal;
- b. a threshold calculator to calculate a ringback threshold based on said calculated energy of said received signal;
- c. a comparator to compare said calculated energy of said received signal to said ringback threshold and to generate a control signal indicative of ringback based on said comparison.

17. The ringback detector of claim 16 wherein said control signal output from said comparator assumes a first state indicative of no ringback when ringback is not detected and assumes a second state indicative of ringback when ringback is detected.

5 18. The ringback detector of claim 17 further comprising a hang-time element to delay for a predetermined period after ringback is no longer detected the change of said control signal from said second state indicative of ringback to said first state indicative of no ringback.

10 19. A method for detecting ringback in a received signal, said method comprising:
a. measuring a characteristic of said received signal;
b. comparing said measurements to a variable threshold, wherein said
variable threshold is based on said measurements of said received signal;
and
15 d. outputting a control signal based on said comparison indicating whether
ringback is present in said received signal.

20 20. The method of claim 19 further comprising setting said threshold to an initial value at the start of a call and adjusting said threshold upwardly based on said measurements of said received signal

21. The method of claim 19 wherein outputting a control signal comprises changing said control signal to a first state indicative of no ringback to a second state indicative of ringback when ringback is detected.

5 22. The method of claim 22 wherein changing said control signal further comprises changing said control signal from said second state indicative of ringback to said first state indicative of no ringback when ringback is no longer detected.

10 23. The method of claim 24 further including maintaining said ringback signal in said second state for a predetermined period of time after ringback is no longer detected.

15 24. A communications terminal comprising:

- a. a receiver for receiving signals transmitted from a remote location;
- b. an audio processing circuit to process audio signals contained in said received signal; and
- c. a ringback detector to determine whether ringback is present in said received signal , said ringback detector including:
 - 1. an energy calculator to calculate the energy of a received signal;
 - 2. a threshold calculator to calculate a ringback threshold based on said calculated energy of said received signal;
 - 3. a comparator to compare said calculated energy of said received signal to said ringback threshold and to generate a control signal to control said audio processing circuit.

31. The communications terminal of claim 24 wherein said audio processing circuit includes a residual echo suppressor.